

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Etienne SUSINI

Serial No.: Not yet assigned
(Continuation of PCT/IB99/01930 filed December 3, 1999
claiming priority of EP No. 98420226.7 filed December 7, 1998)

Filed: (on even date herewith)

For: **MULTILAYER COMPOSITE FILM AND USE OF THIS FILM**

PRELIMINARY AMENDMENT

BOX FEE AMENDMENT

Assistant Commissioner for Patents
Washington, D.C. 20231

Dear Sir:

Prior to the calculation of fees and the examination of the above-identified application, kindly amend the application as follows:

AMENDMENT

IN THE CLAIMS

Cancel claims 1 through 9, and add new claims 10 through 47 as identified below:

10. (New). A multilayer composite film of food grade quality, comprising:
a middle layer based on polypropylene sandwiched between two outside layers of LLDPE, said two outside layers of LLDPE having a density between approximately 0.919 to 0.930 g/cm^3 , said middle layer containing approximately 50 to 70% by weight of polypropylene having a density between approximately 0.895 and 0.905 g/cm^3 and a melt index approximately between 0.75 and 0.85 g/10 minutes, and approximately 10 to 30% by weight of said LLDPE and approximately 10 to 30% by weight of a thermoplastic polyolefin having a density approximately between 0.885 and 0.905 g/cm^3 and a melt index approximately between 0.55 and 0.65 g/10 minutes.

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11. (New) The multilayer composite film of claim 10 wherein said multilayer composite film has a thickness between approximately 30 μm and 120 μm .

12. (New) The multilayer composite film of claim 11 wherein the Vicat temperature of said LLDPE is greater than 100° C and wherein the Vicat temperature of said polypropylene is less than 160° C.

13. (New) The multilayer composite film of claim 11 wherein the thickness of said middle layer is approximately twice the thickness of each of said two outside layers.

14. (New) The multilayer composite film of claim 12 wherein the thickness of said middle layer is approximately twice the thickness of each of said two outside layers.

15. (New) The multilayer composite film of claim 11 wherein said multilayer composite film is produced without any corona oxidation treatment.

16. (New) The multilayer composite film of claim 12 wherein said multilayer composite film is produced without any corona oxidation treatment.

17. (New) The multilayer composite film of claim 13 wherein said multilayer composite film is produced without any corona oxidation treatment.

18. (New) The multilayer composite film of claim 14 wherein said multilayer composite film is produced without any corona oxidation treatment.

19. (New) The multilayer composite film of claim 11 wherein at least one of said outside layers contains less than 1300 ppm of a slip agent.

20. (New) The multilayer composite film of claim 12 wherein at least one of said outside layers contains less than 1300 ppm of a slip agent.

21. (New) The multilayer composite film of claim 13 wherein at least one of said outside layers contains less than 1300 ppm of a slip agent.

22. (New) The multilayer composite film of claim 14 wherein at least one of said outside layers contains less than 1300 ppm of a slip agent.

23. (New) The multilayer composite film of claim 15 wherein at least one of said outside layers contains less than 1300 ppm of a slip agent.

24. (New) The multilayer composite film of claim 16 wherein at least one of said outside layers contains less than 1300 ppm of a slip agent.

25. (New) The multilayer composite film of claim 17 wherein at least one of said outside layers contains less than 1300 ppm of a slip agent.

26. (New) The multilayer composite film of claim 18 wherein at least one of said outside layers contains less than 1300 ppm of a slip agent.

27. (New) The multilayer composite film of claims 19 through 26 wherein said slip agent is Erucamide®.

28. (New) A combination valve and withdrawing pipe for dispensing liquids from a sealed container, comprising:

a withdrawing pipe having a first portion and a second portion, said second portion having a lower end gradually increasing in cross section to an upper end defining a bearing surface;

a valve disposed between walls of the sealed container, said valve comprising:

a first strip of multilayer composite film;

a second strip of multilayer composite film;

a weld uniting said first and second strips of multilayer composite film along two non converging lines to form a distribution passage therebetween, said distribution passage having an entry section with a perimeter for

receiving a said first portion of said withdrawing pipe and said perimeter being less than said second portion of said withdrawing pipe such that said bearing surface prevents said withdrawing pipe from being withdrawn from said passage;

a cut in said distribution passage in at least one of said first and second strips to thereby communicate liquid within the container into said passage.

29. (New) The combination valve and withdrawing pipe of claim 28 wherein said multilayer composite film of said first and second strips comprises:

a middle layer based on polypropylene sandwiched between two outside layers of LLDPE, said two outside layers of LLDPE having a density between approximately 0.919 to 0.930 g/cm^3 , said middle layer containing approximately 50 to 70% by weight of polypropylene having a density between approximately 0.895 and 0.905 g/cm^3 and a melt index approximately between 0.75 and 0.85 g/10 minutes, and approximately 10 to 30% by weight of said LLDPE and approximately 10 to 30% by weight of a thermoplastic polyolefin having a density approximately between 0.885 and 0.905 g/cm^3 and a melt index approximately between 0.55 and 0.65 g/10 minutes.

30. (New) The combination valve and withdrawing pipe of claim 28 wherein said multilayer composite film of said first and second strips has a thickness between approximately 30 μm and 120 μm .

31. (New) The combination valve and withdrawing pipe of claim 30 wherein said multilayer composite film of said first and second strips has a Vicat temperature of said LLDPE is greater than 100° C and wherein the Vicat temperature of said polypropylene is less than 160° C.

32. (New) The combination valve and withdrawing pipe of claim 30 wherein said middle layer of said multilayer composite film of said first and second strips has a thickness approximately twice the thickness of each of said two outside layers.

[illegible][illegible]

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[illegible][illegible][illegible][illegible][illegible]

41. (New) The combination valve and withdrawing pipe of claim 33 wherein at least one of said outside layers of said multilayer composite film of said first and second strips contains less than 1300 ppm of a slip agent.

42. (New) The combination valve and withdrawing pipe of claim 34 wherein at least one of said outside layers of said multilayer composite film of said first and second strips contains less than 1300 ppm of a slip agent.

43. (New) The combination valve and withdrawing pipe of claim 35 wherein at least one of said outside layers of said multilayer composite film of said first and second strips contains less than 1300 ppm of a slip agent.

44. (New) The combination valve and withdrawing pipe of claim 36 wherein at least one of said outside layers of said multilayer composite film of said first and second strips contains less than 1300 ppm of a slip agent.

45. (New) The combination valve and withdrawing pipe of claim 37 wherein at least one of said outside layers of said multilayer composite film of said first and second strips contains less than 1300 ppm of a slip agent.

46. (New) The combination valve and withdrawing pipe of claims 38 through 45 wherein said slip agent is Erucamide®.

47. (New) The combination valve and withdrawing pipe of claims 38 through 45 wherein said outside layer of said multilayer composite film of said first and second strips to which said slip agent is added is the layer adjacent to said passage.

IN THE SPECIFICATION

In the specification, please make the following amendments:

On page 1, after line 2, insert the following:

-- CROSS REFERENCE TO RELATED APPLICATIONS

This application is a Continuation application of PCT/IB99/01930 filed December 3, 1999, which claims priority of EP No. 98420226.7 filed December 7, 1998 entitled Multilayer Composite Film and Use of this Film. Priority is claimed to the PCT application filing date under 35 U.S.C. § 365.--

On page 1, delete lines 3 through 8.

On page 1, after line 8 and before line 9, insert the following:

-- BACKGROUND OF THE INVENTION

1. Field of the Invention.

This invention relates generally to multilayer composite films and more particularly to food grade quality multilayer composite films for use in packaging liquids.

2. Description of the Related Art. --

On page 1, line 17, replace the word "LLDPE" with -- Linear Low Density Polyethylene (LLDPE) --

On page 2, line 33, after "combined." insert --Accordingly, there is a need in the industry for a multilayer composite film that overcomes the aforementioned short comings of the prior art.--

[illegible]

-- SUMMARY OF THE INVENTION

The present invention relates to a multilayer composite film of food grade quality and to the use of this multilayer composite film in packaging liquids. The preferred multilayer composite film of the present invention has a thickness between 30 μm and 120 μm , comprising a layer based on polypropylene (pp) sandwiched between two outside layers of LLDPE, the density of which is preferably between 0.919 and 0.930 g/cm^3 .--

On page 3, before line 23, insert the following:

--BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a plan view of a valve in combination with a withdrawing pipe, the valve being constructed of two strips of the multilayer composite film of the present invention.--

On page 3, line 8, delete “as defined by claim 1”.

On page 3, lines 9 and 10, delete “as defined by claim 7. Various” and insert --and various--.

On page 3, lines 11 and 12, delete “correspond to the definitions given in the claims dependent on claim 1”.

On page 3, delete lines 23 through 24.

On page 3, before line 25 insert the following:

-- DETAILED DESCRIPTION OF THE INVENTION --

On page 8, after line 1 insert:

--What is Claimed is:--.

After page 9, insert the following for the Abstract, also submitted as a separate page:

---Abstract of the Disclosure

The invention concerns a multilayer composite film for packaging food comprising a polypropylene layer sandwiched between two outer PE layers. Said film thickness ranges between 30 μm and 120 μm , the outer layers being made of LLDPE whereof the density d is $0.919 < d < 0.930 \text{ g/cm}^3$ and the median layer being made of a mixture comprising 50-70% of PP whereof the density d is $0.895 < d < 0.905 \text{ g/m}^3$, whereof the melt index ranges between 0.75 and 0.85 g/10 minutes, 10-30% of said LLDPE and 10-30% if a thermoplastic polyolefin whereof the density d is $0.885 < d < 0.905 \text{ g/m}^3$ and whereof the melt index is between 0.55 and 0.65 g/10 minutes.---

REMARKS

Claims 10-47 are pending in the above-identified application.

Claims 1-9 were canceled. New claims 10-47 have been added to replace canceled claims 1-9.

No new matter is believed to have been introduced by this amendment.

Section headings have been added and amendments have been made to the specification as well as the addition of an Abstract of the Disclosure in order to bring the application in conformance with 37 C.F.R. § 1.77.

In accordance with 37 C.F.F. § 1.121, attached hereto are the marked-up versions of the specification showing the changes made and versions of the specification in clear form incorporating the changes made.


CONCLUSION

Favorable action is most earnestly solicited.

If the Examiner has any questions, or wishes to discuss this matter, please contact the undersigned at the telecommunication numbers listed below.

Respectfully submitted,

Etienne SUSINI



Thomas J. Oppold
Reg. No. 42,054

6/6/01

Date
HENDERSON & STURM LLP
206 Sixth Avenue, Suite 1213
Des Moines, Iowa 50309
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Abstract of the Disclosure

The invention concerns a multilayer composite film for packaging food comprising a polypropylene layer sandwiched between two outer PE layers. Said film thickness ranges between 30 μm and 120 μm , the outer layers being made of LLDPE whereof the density d is $0.919 < d < 0.930 \text{ g/cm}^3$ and the median layer being made of a mixture comprising 50-70% of PP whereof the density d is $0.895 < d < 0.905 \text{ g/m}^3$, whereof the melt index ranges between 0.75 and 0.85 g/10 minutes, 10-30% of said LLDPE and 10-30% if a thermoplastic polyolefin whereof the density d is $0.885 < d < 0.905 \text{ g/m}^3$ and whereof the melt index is between 0.55 and 0.65 g/10 minutes.

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Version with markings showing the changes made

MULTILAYER COMPOSITE FILM AND USE OF THIS FILM
CROSS REFERENCE TO RELATED APPLICATIONS

This application is a Continuation application of PCT/IB99/01930 filed December 3, 1999, which claims priority of EP No. 98420226.7 filed December 7, 1998 entitled Multilayer Composite Film and Use of this Film. Priority is claimed to the PCT application filing date under 35 U.S.C. § 365.

~~The present invention relates to a multilayer composite film of food grade quality, the thickness of which is between 30 μ m and 120 μ m, comprising a layer based on PP sandwiched between two outside layers of LLDPE, the density d of which is between 0.919 < d < 0.930 g/cm³, and to a use of this film.~~

BACKGROUND OF THE INVENTION

1. Field of the Invention.

This invention relates generally to multilayer composite films and more particularly to food grade quality multilayer composite films for use in packaging liquids.

2. Description of the Related Art.

Multilayer composite films are well known and are generally intended to combine the physical or chemical properties of various polymer materials according to the desired properties.

EP 0 247 896 discloses a weldable film comprising a base layer which contains a polyolefin, which on at least one of its sides has 1 to 20% by weight based on the base layer of a film containing a blend of 70 to 95% by weight of an LLDPE- Linear Low Density Polyethylene (LLPDE) and 5 to 30% by weight of a resin with a molecular weight lower than that of the LLDPE.

Another weldable multilayer film based on polypropylene comprising at least one outside layer of LLDPE of which the density is from 0.893-0.905 g/cm³, the melt index from 0.1-10 g/10 minutes and containing up to 20% of a comonomer, in JP 09 207294. [sic]

JP 09 314769 describes a weldable film comprising a film of flexible resin of the polypropylene type onto the opposite faces of which LLDPE films are laminated.

JP 10 272747 relates to a stretchable film with three layers or more comprising, at its surface, a layer of LLDPE and a layer of amorphous copolymer and, by way of middle layer,

a blend of polypropylene (C), of poly(1-butene) (D) in a ratio (C) / (D) = 0.10-9.0. A surfactant of nonionic type is combined with one or more of the layers.

US 5 085 927 proposes to increase the molding property of a stretchable film by adding an elastomer compound in addition to the adhesion promoters which in themselves increase the molding properties of the film.

Elsewhere, particularly in WO 98/28199, there has been proposed a sachet for packaging liquid, comprising a valve for controlling the dispensing of the liquid, consisting of the superposition of two films welded along two non-converging lines to form a dispensing passage by the parting of these two films. This passage preferably has an entry passageway, the perimeter of which corresponds to that of a straw, the end of which is bulged. This film has enough elasticity to allow it to expand as this straw is being introduced and to then close up around it to prevent it from being withdrawn from said passage. The straw is thus secured to the sachet and can only be withdrawn by the amount necessary to allow the passage forming the valve to close.

The material of the film forming the valve has therefore to have enough elasticity to close up around the straw while at the same time allowing the bulged part to pass. This film has to be compatible with drinks and therefore meet standards relating to food products. As a preference, this material has to maintain its properties even after it has been subjected to a temperature of between 80° and 90°C, which is frequently that of the drink at the time that it is packaged in the sachet.

The combination of all these properties, some of which are contradictory, is not easy to achieve even with combinations of several layers of different polymers. In particular, none of the abovementioned documents of the prior art allows these properties to be combined. Accordingly, there is a need in the industry for a multilayer composite film that overcomes the aforementioned short comings of the prior art.

SUMMARY OF THE INVENTION

The present invention relates to a multilayer composite film of food grade quality and to the use of this multilayer composite film in packaging liquids. The preferred multilayer composite film of the present invention has a thickness between 30 µm and 120 µm, comprising a layer based on polypropylene (pp) sandwiched between two outside layers of LLDPE, the density of which is preferably between 0.919 and 0.930 g/cm³.

It is an object of the present invention to obtain a film capable of meeting at least the

main requirements, that is to say, in addition to the properties of flexibility needed to allow the passage that forms the valve to close in a sealed manner, the properties of elasticity and of compatibility with food standards. As a preference, the film according to the invention should withstand the temperature of the liquid to be packaged, which may be as high as 80° or even 90°, while keeping its flexibility and elasticity properties intact.

To this end, a very first subject of the invention is a multilayer composite film of the abovementioned type ~~as defined by claim 1~~. Another subject is a use of this film and as defined by claim 7. ~~Various~~ various preferred embodiments of the composite film correspond to the definitions given in the claims ~~dependent on claim 1~~.

Tests carried out with the multilayer film that is the subject of the present invention have shown that such a film makes it possible to meet all the abovementioned requirements, both as regards the valve and as regards the ability to hold the straw in the valve passage and obviously to introduce this straw into this passage. This film also allows all these properties to be maintained after the liquid has been packaged at a temperature of at least 80°C and which may be as high as 90°C.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a plan view of the valve and withdrawing pipe of the present invention, the valve being constructed of two strips of the multilayer composite film of the present invention welded together along two non-converging lines to form a distribution passage.

~~The invention will be better understood upon reading the examples which follow.~~

DETAILED DESCRIPTION OF THE INVENTION

According to one embodiment, the two outside layers of the multilayer film that is the subject of the present invention are made of an LLPDE (Linear Low Density Polyethylene), Dow Elite® 5110, the density d of which is 0.925 g/cm³ and the melt index MI of which is 0.85 g/10 minutes according to the ASTM D 1238 standard, measurements taken at 230°C, applying a mass of 2.16 kg, with a standard nozzle 2.095 mm in diameter, with the Vicat softening temperature T_v being 113°C. As a preference, a slip agent, in this example 900 ppm of Erucamide® which is a derivative of erucic acid, the molecule of which is cis-13-docosenamide, is added to at least one of the two outside layers of the film, that is to say to the one which will be on the inside of the passage forming the valve and which will

MULTILAYER COMPOSITE FILM AND USE OF THIS FILM
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Another weldable multilayer film based on polypropylene comprising at least one outside layer of LLDPE of which the density is from 0.893-0.905 g/cm³, the melt index from 0.1-10 g/10 minutes and containing up to 20% of a comonomer, in JP 09 207294. [sic]

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JP 10 272747 relates to a stretchable film with three layers or more comprising, at its surface, a layer of LLDPE and a layer of amorphous copolymer and, by way of middle layer, a blend of polypropylene (C), of poly(1-butene) (D) in a ratio (C) / (D) = 0.10-9.0. A surfactant of nonionic type is combined with one or more of the layers.

US 5 085 927 proposes to increase the molding property of a stretchable film by adding an elastomer compound in addition to the adhesion promoters which in themselves increase the molding properties of the film.

Elsewhere, particularly in WO 98/28199, there has been proposed a sachet for packaging liquid, comprising a valve for controlling the dispensing of the liquid, consisting of the superposition of two films welded along two non-converging lines to form a dispensing passage by the parting of these two films. This passage preferably has an entry passageway, the perimeter of which corresponds to that of a straw, the end of which is bulged. This film has enough elasticity to allow it to expand as this straw is being introduced and to then close up around it to prevent it from being withdrawn from said passage. The straw is thus secured to the sachet and can only be withdrawn by the amount necessary to allow the passage forming the valve to close.

The material of the film forming the valve has therefore to have enough elasticity to close up around the straw while at the same time allowing the bulged part to pass. This film has to be compatible with drinks and therefore meet standards relating to food products. As a preference, this material has to maintain its properties even after it has been subjected to a temperature of between 80° and 90°C, which is frequently that of the drink at the time that it is packaged in the sachet.

The combination of all these properties, some of which are contradictory, is not easy to achieve even with combinations of several layers of different polymers. In particular, none of the abovementioned documents of the prior art allows these properties to be combined. Accordingly, there is a need in the industry for a multilayer composite film that overcomes the aforementioned short comings of the prior art.

SUMMARY OF THE INVENTION

The present invention relates to a multilayer composite film of food grade quality and to the use of this multilayer composite film in packaging liquids. The preferred multilayer composite film of the present invention has a thickness between 30 μm and 120 μm , comprising a layer based on polypropylene (pp) sandwiched between two outside layers of LLDPE, the density of which is preferably between 0.919 and 0.930 g/cm^3 .

It is an object of the present invention to obtain a film capable of meeting at least the

main requirements, that is to say, in addition to the properties of flexibility needed to allow the passage that forms the valve to close in a sealed manner, the properties of elasticity and of compatibility with food standards. As a preference, the film according to the invention should withstand the temperature of the liquid to be packaged, which may be as high as 80° or even 90°, while keeping its flexibility and elasticity properties intact.

To this end, a very first subject of the invention is a multilayer composite film of the abovementioned type. Another subject is a use of this film and various preferred embodiments of the composite film.

Tests carried out with the multilayer film that is the subject of the present invention have shown that such a film makes it possible to meet all the abovementioned requirements, both as regards the valve and as regards the ability to hold the straw in the valve passage and obviously to introduce this straw into this passage. This film also allows all these properties to be maintained after the liquid has been packaged at a temperature of at least 80°C and which may be as high as 90°C.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a plan view of the valve and withdrawing pipe of the present invention, the valve being constructed of two strips of the multilayer composite film of the present invention welded together along two non-converging lines to form a distribution passage.

DETAILED DESCRIPTION OF THE INVENTION

According to one embodiment, the two outside layers of the multilayer film that is the subject of the present invention are made of an LLPDE (Linear Low Density Polyethylene), Dow Elite® 5110, the density d of which is 0.925 g/cm^3 and the melt index MI of which is 0.85 g/10 minutes according to the ASTM D 1238 standard, measurements taken at 230°C, applying a mass of 2.16 kg, with a standard nozzle 2.095 mm in diameter, with the Vicat softening temperature T_v being 113°C. As a preference, a slip agent, in this example 900 ppm of Erucamide® which is a derivative of erucic acid, the molecule of which is cis-13-docosenamide, is added to at least one of the two outside layers of the film, that is to say to the one which will be on the inside of the passage forming the valve and which will